



Challenges of COVID-19 testing in low-middle income countries (LMICs): the case of Malawi

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Received: 02 August 2020; Accepted: 12 September 2020; Published: 30 October 2020.

doi: 10.21037/jlpm-20-84

View this article at: <http://dx.doi.org/10.21037/jlpm-20-84>

Malawi registered its first coronavirus disease 2019 (COVID-19) case on 2 April 2020. Since then the country has seen a rise of confirmed cases, first coming from cross-border travel and later by subsequent community transmission (1). The government together with local and international organizations mounted a front against COVID-19 by equipping the health care system with personnel and training on case identification, management and follow-up, contact tracing, acquiring personal protective equipment (PPE) for healthcare workers and setting up protocols in handling the outbreak. Like many other countries, the medical laboratory has found itself central in the COVID-19 fight by providing accurate and reliable laboratory results. Globally, 70% of decisions with patient care are based on laboratory results (2). Realizing this importance, Malawi set up COVID-19 assessment and testing centres. This commentary looks at the role of the medical laboratories in the fight against COVID-19 in Malawi and the challenges of testing to deliver efficient services.

Challenges of testing

When COVID-19 started to spread in Africa, Malawi was already preparing for it. On 23 March 2020, Malawi declared this pandemic a national disaster and put up measures to prevent the importation of the virus to the country. The government outlined immediate activities including setting up diagnostic laboratories for case confirmation. With funding from partner organisations such as United Nations Children's Fund (UNICEF), an existing reverse transcription polymerase chain reaction (RT-PCR) machine at Lilongwe National Reference Laboratory was set up (3). Other teaching and research institutions such as College of Medicine of the University of Malawi and the Malawi-Liverpool Wellcome Trust set up their diagnostic laboratories to complement the efforts of the Ministry of Health.

With 3 testing sites (in the south and central regions of the country) and 8 cases in early May 2020, the government added 13 more COVID-19 testing facilities by 27 May 2020

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and 41 testing sites by 3 July 2020 across the country (4), though screening and testing are still relatively lower than other African countries. With a total population of 18 million, Malawi has managed to analyse over 21,500 samples as of 15 July 2020, representing approximately 0.1% of the total population (5). Governments across Africa report varying testing capabilities with South Africa doing more than Nigeria, Senegal, Ethiopia and Ghana. By 15 June 2020, Nigeria had tested 96,402, Senegal 64,501 and South Africa 1,121,958 (6).

Since the first reported case in Malawi, the country struggled with testing due to inadequate capacity, untrained laboratory personnel, inadequate funding and lack of policies. Despite substantial evidence that national laboratory systems (comprising public health, government, private, and mission hospitals) are a key component of the overall health system; it remains one of the most neglected components, particularly in a resource limited country like Malawi. Achieving accurate diagnosis of COVID-19 as a key component in addressing the pandemic has been a major challenge of the Malawian laboratory due to inadequate qualified laboratory human resources. There is a lack of laboratory personnel in testing facilities despite having a pool of unemployed and qualified experts. With the rise in cases, the laboratory needs to be actively supported by qualified staff to ensure that services are not disrupted in the fight against COVID-19. Recruiting and capacity building of human and technical resources to face unexpected health crises is ideal to ensure uninterrupted provision of health services. There is a need to augment the human resources for health as the entire system of care will be challenged by an enormously amplified volume of tests to manage emergent situations.

This pandemic provided a push to urgently revise and put into effect the National Laboratory Strategic Plans and Policies to strengthen laboratory systems, as an integral part of strengthening overall health systems in developing countries (7). The government and its key partners, like the African Centres for Disease Control and Prevention (Africa CDC) and World Health Organization (WHO), need to take the leading role in the revision as part of the overall health sector development investment. These plans should be comprehensive and not disease-specific and should integrate multiple diseases with the ultimate goal of establishing a functional tiered laboratory network in the country as proposed by the WHO. Laboratory plans should also be considered a key component of implementing the International Health Regulations (IHR), which is a legally binding agreement of all member states of WHO

to help the international community prevent and respond to acute public health risks with global impact, such as influenza, multidrug-resistant and extensively drug-resistant tuberculosis, and other diseases.

Perennial lack of funding resulted in inadequate and poor infrastructure, irregular water supply, insufficient electricity supply and lack of electrical backup systems, lack of specialised laboratory equipment, inadequate supply-chain management for consumables and reagents, poor equipment maintenance, and lack of clear policies (8). Funding issues make it inadequate to meet priority needs such as employing and training laboratory personnel and timely procurement of diagnostic materials that has been worsened by scarcity of COVID-19 test kits, reagents and swabs around the world (9). These challenges mean that turnaround times and increasing capacity of testing for diagnosis of COVID-19 cases may not be as quick as would be desirable.

Way forward

The management of patients with COVID-19 infection entails early identification, rapid isolation, timely establishment of infection prevention and control measures, together with care for patients with mild disease and supportive treatment for those with severe COVID-19 disease. Malawi can attain a rapid turnaround and increased capacity of testing by strengthening coordination between government and the private sector to help unseat testing backlogs, implement quickly the comprehensive national laboratory strategic plan that focuses on strengthening cross-cutting core elements of laboratory health systems focusing on (I) a framework for training, retaining, and career development of laboratory workers; (II) infrastructure development; (III) supply-chain management of laboratory supplies and maintenance of laboratory equipment particularly in the crisis; (IV) standards for quality management systems and accrediting laboratories and facilities; (V) laboratory information systems; and (VI) biosafety and waste management (10).

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was a standard

submission to the journal. The article did not undergo external peer review.

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/jlpm-20-84>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/jlpm-20-84

Cite this article as: Munharo S, Nayupe S, Mbulaje P, Patel P, Banda C, Gacutno KJA, Lin X, Shawa IT, Lucero-Prisno DE 3rd. Challenges of COVID-19 testing in low-middle income countries (LMICs): the case of Malawi. *J Lab Precis Med* 2020;5:32.